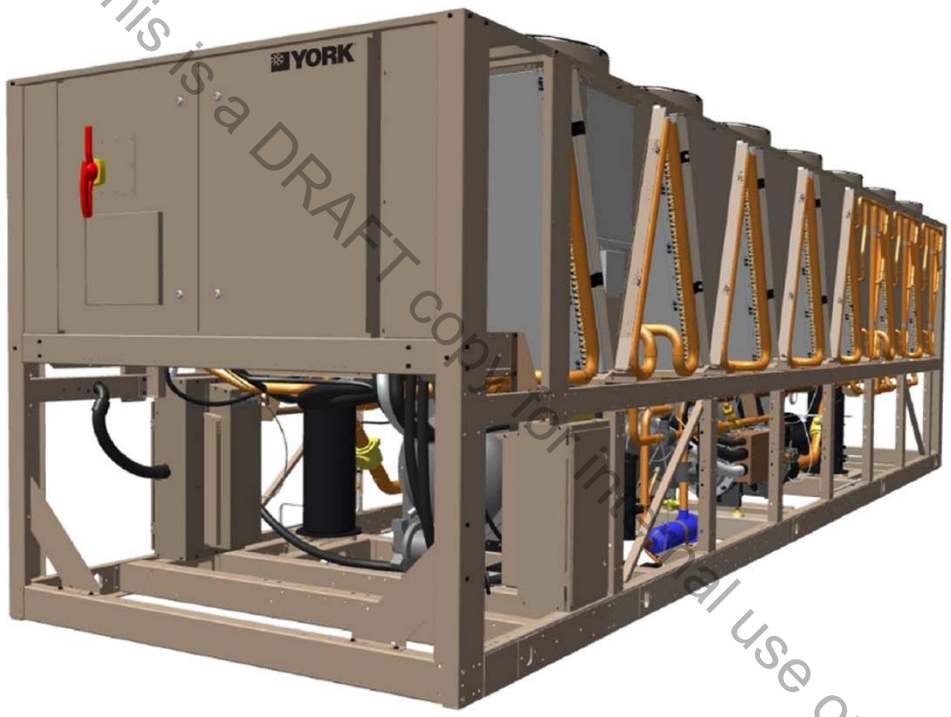
YORK YVFA



The first VSD Screw Chiller with integrated "Free Cooling" waterside economizer

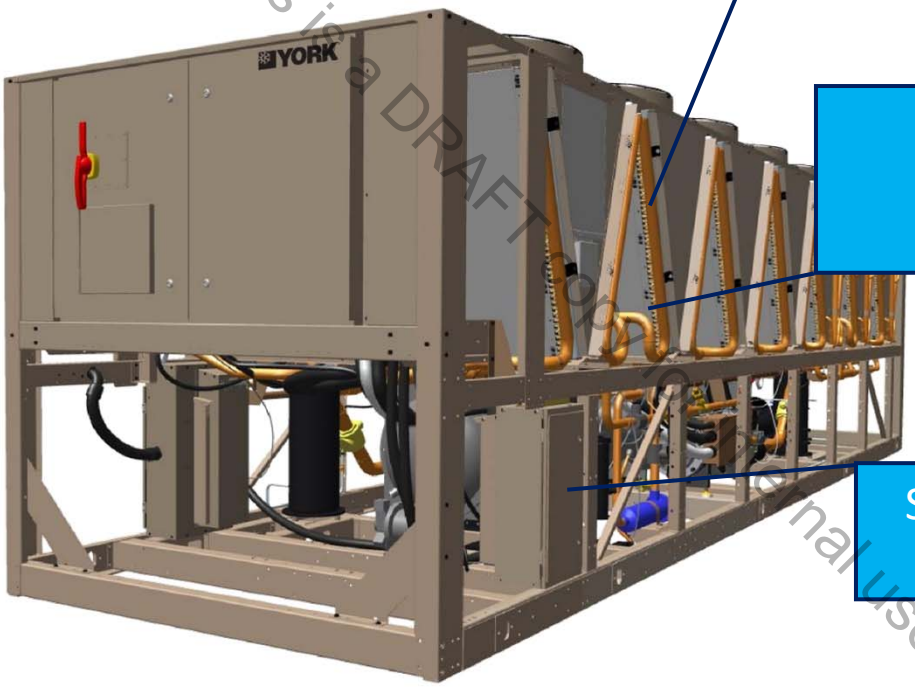
Key Dates – Monterrey Source

- Open Loop – first phase units
  - 0259, 0309, 0359 / 0889, 1069, 1239
- First order: April

- Closed Loop (Glycol Free) following in July
  - with additional Open Loop (Glycol) models

- Entire range to release by end of 2016
  - both open loop and closed loop
  - 150 – 450T / 525 – 1580 kW
  - 8 models each open and closed loop

Components



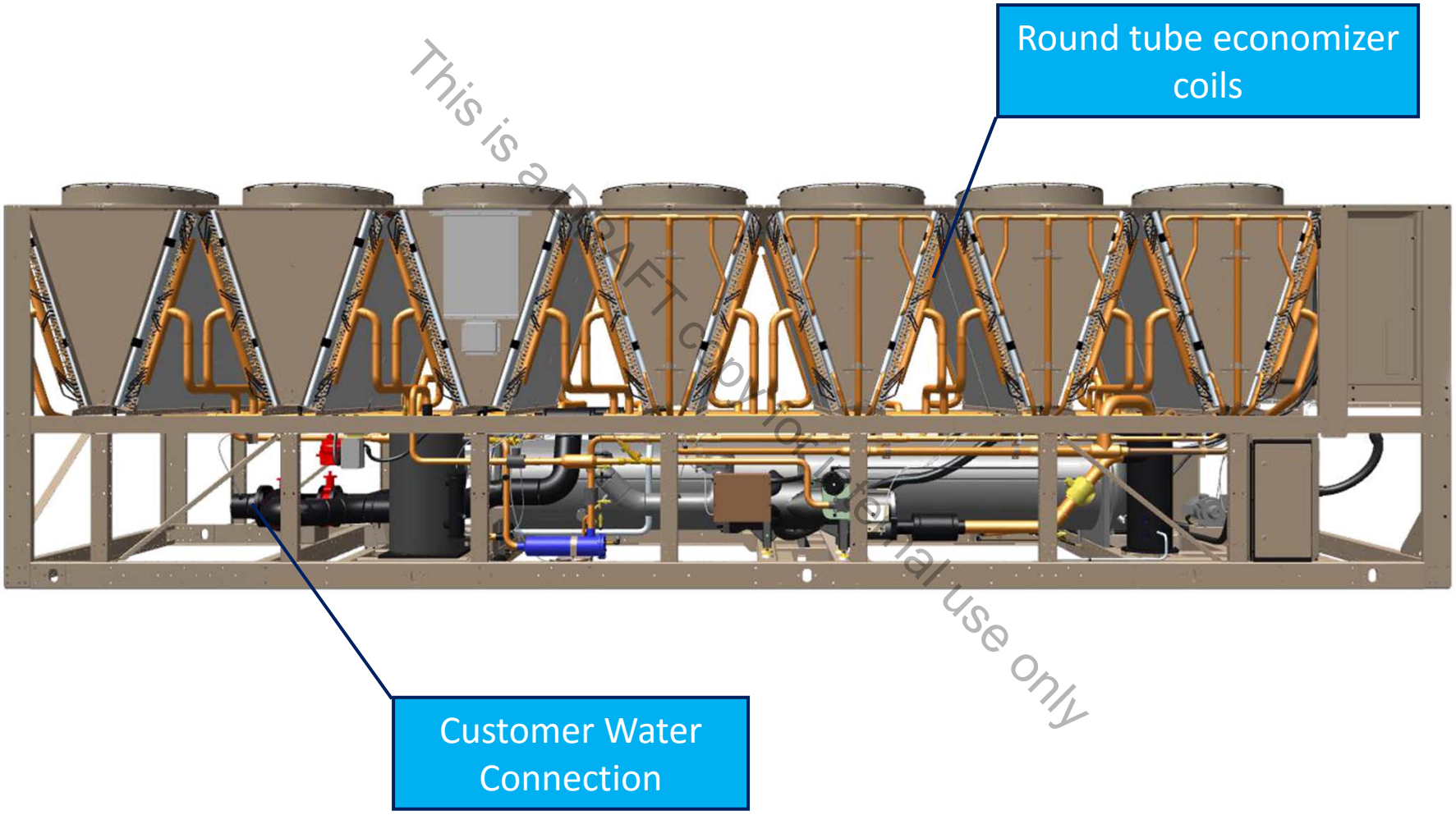
Round Tube Fin economizer coils

Microchannel condenser coil

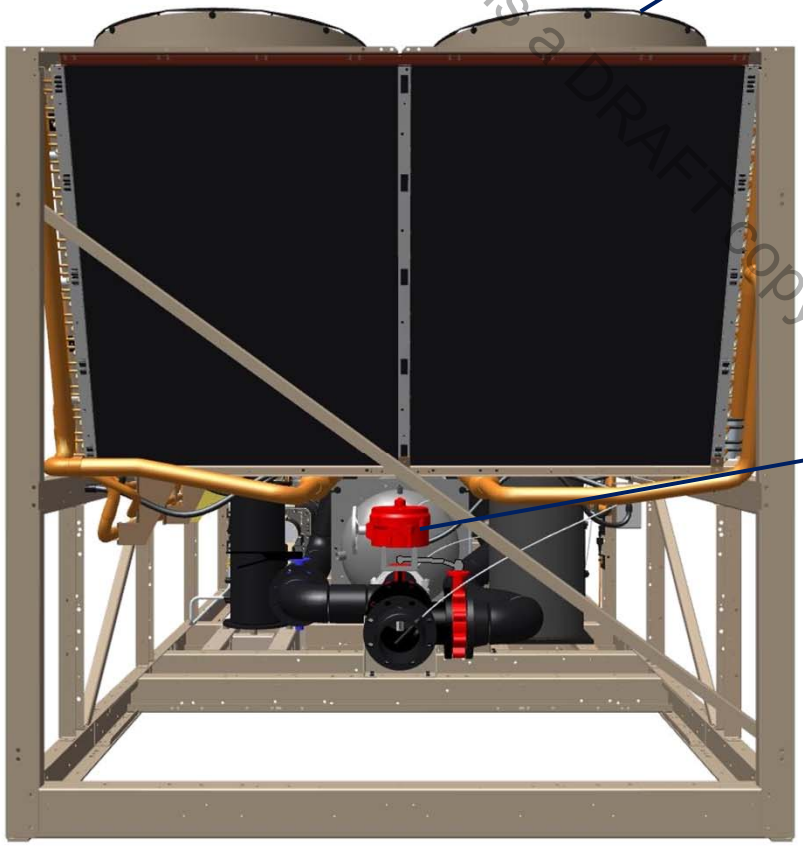
Standard Fan VSD (one per circuit)

Two options for “free cooling” liquid circuit in series with evaporator

Components



Components



High Airflow VSD Fans

Maximum airflow for highest efficiency across entire range of mechanical, hybrid and economized cooling

Maximum heat transfer at part load with all coils active (VSD)

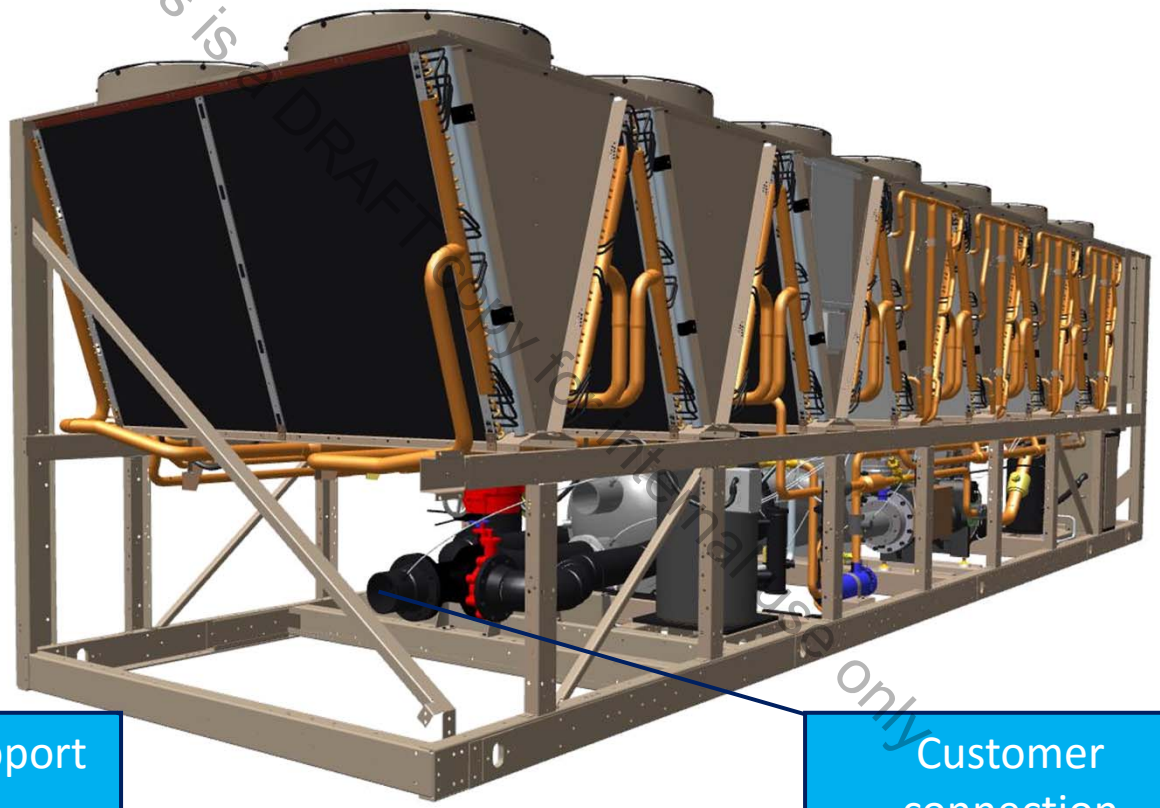
Unit controlled bypass valve

Bypasses economizer coils when ambient temperature is too high for free cooling, to reduce pump energy

3Way Coolant Valve

- A 3-way valve is used only in the open loop free cooling systems to control the flow direction of coolant.
- The 3-way valve only has two positions, fully open or fully closed.

Components



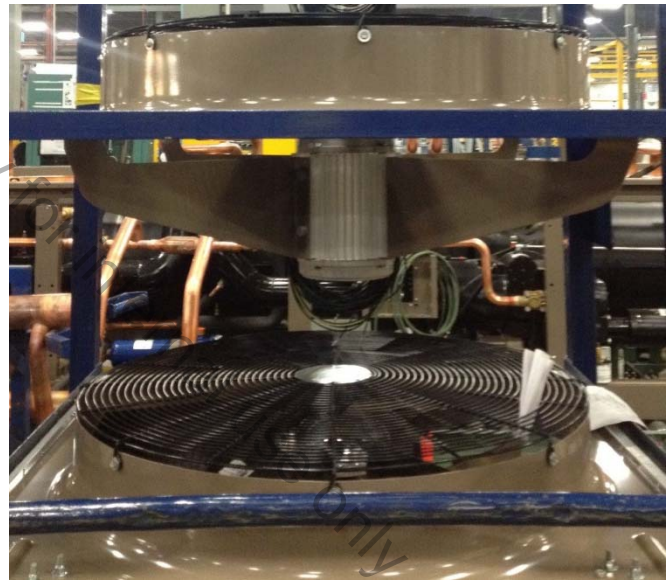
Back view, support removed

Customer connection

Condenser Fans

- In the closed Loop system the fan speed is adjusted to keep the glycol temperature above the freezing point.
- Industrial Fan Motor, VFD driven standard
  - VFD duty 3hp TEAO, IP 55 fan motor with aluminum finned housing, permanently lubricated bearings, high airflow for max performance

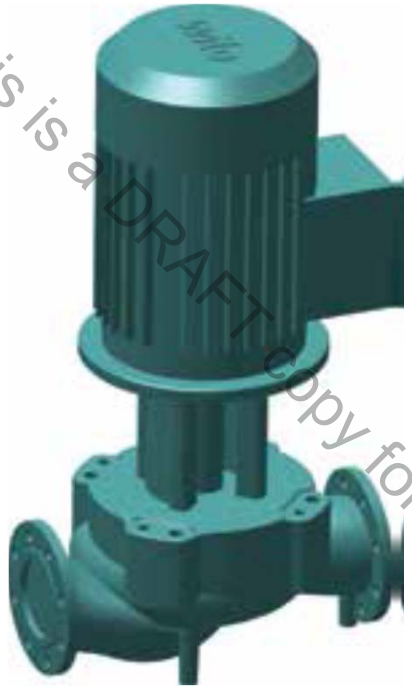
Fan inverter in enclosure



High airflow fan assembly

Closed Loop Components

The Expansion tank charged with pressured Nitrogen gas

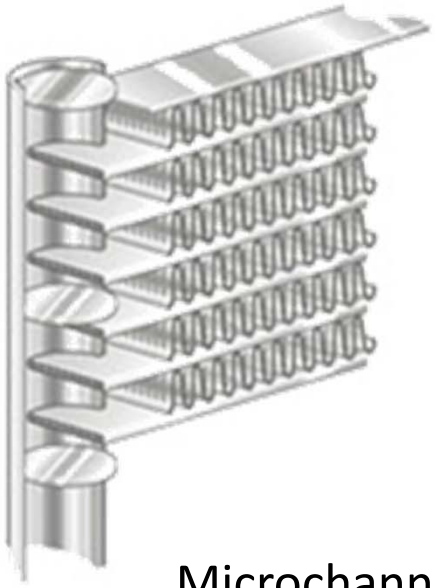


The glycol pump is only in the closed loop free cooling system and is used to circulate the glycol liquid through the free cooling coil.

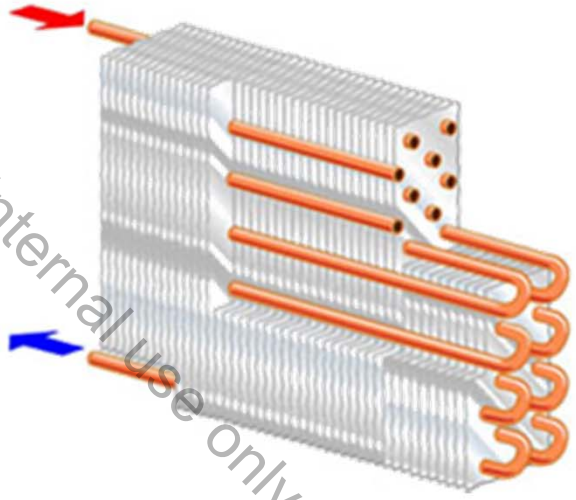
The Brazed Plate Heat Exchanger is only used in the closed loop free cooling system.

Condenser and Economizer

- Microchannel Heat Exchanger condenser
- Round Tube Plate Fin economizer coils



Microchannel Coil



Round Tube Plate Fin Coil

Components Options

- Thermal Dispersion flow switch – high quality, high reliability IFM Efector flow switch. Stainless steel (IP67) housing and sensor, with LED display for flow and output status. Includes cable and weld adapter fitting for field install in pipework.

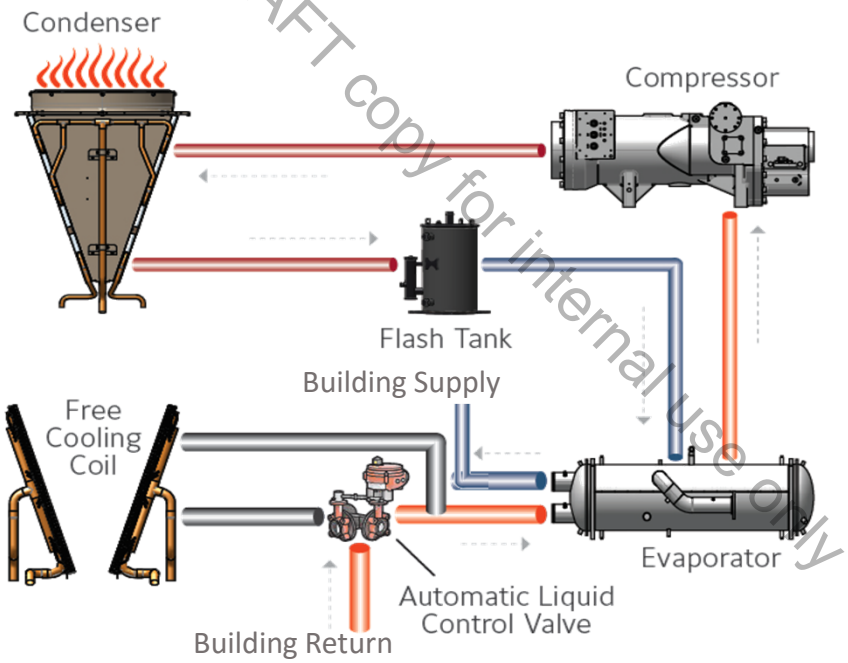
Building Booster Pump

- Liquid pressure drop in Hybrid and Full Free Cooling mode = evaporator + free cooling coils
- Simplest solution: VSD pump
  - Best efficiency in all modes
  - Maintains constant flow when head pressure changes
- Constant Speed Pumps
  - Flow will reduce when free cooling coils active (Hybrid or full Free Cooling mode)
  - Terminal unit coils must be sized to meet cooling at minimum flow

Pump with integrated VSD

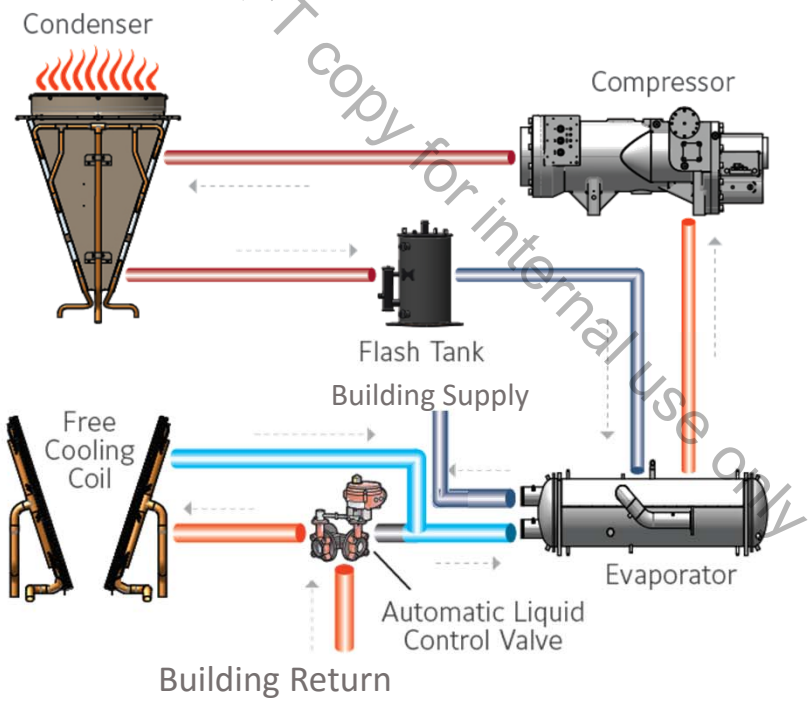
Operating Modes

- **Mechanical Cooling Mode**
  In this mode, the YVFA free cooling option is disabled either due to automatic control logic or operator setting. This mode is generally selected when ambient temperatures are above 44.6°F. When operating in this mode, the YVFA functions very similar to a standard YVAA Air-Cooled Screw Compressor chiller.



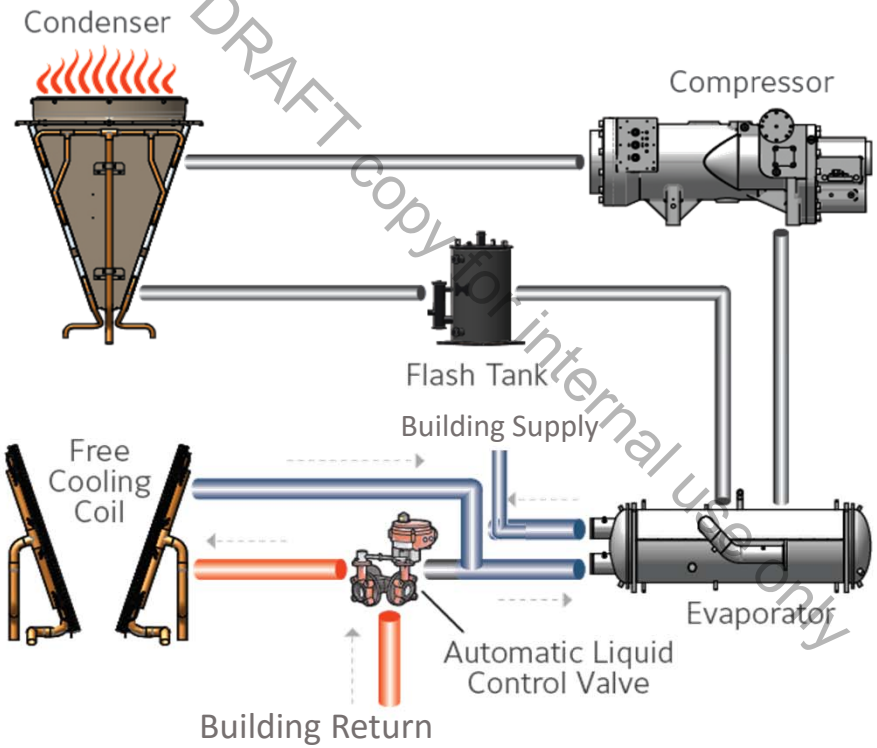
Operating Modes

- **Hybrid Cooling Mode**
  In this mode, both the free cooling option and the compressor are operating together. This mode is generally selected when ambient temperatures are between 23°F and 44.6°F. When operating in this mode, the chilled water first flows through the free cooling coil and then enters the cooler to further cool down. All fans will run at the same speed based on the control logic to ensure maximum energy savings.



Operating Modes

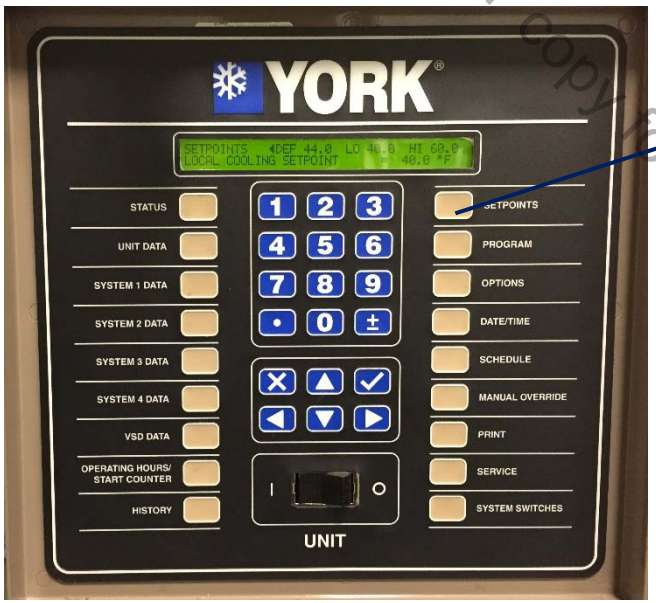
- **Free Cooling Mode**
  In this mode, the YVFA free cooling option is only enabled; no compressor will run. This mode is generally selected when ambient temperatures are below 23°F. When operating in this mode, cooling capacity is dependent on the free cooling system.



Control

Field erected waterside economizers are complex – YVFA is simple:

- Single setpoint liquid temp control – same as a chiller
- Adjustable deadband allows user control of hybrid mode start point
  Customers with large pumps may prefer greater temperature delta between ambient and entering liquid temp to offset pump energy
- Wide operating range: -20°F to 115°F



Single setpoint for leaving liquid temperature

All economizer functions are automatic

Maintenance

- Coil cleaning access from inside of vee-coil is similar to cutout used for servicing VSD cooling coil (photo to right)
- No difference from YVAA on basic service intervals – 5 years on VSD cooling glycol, annual coil cleanings
- Coils include vents at top of header for easy purge process
- Drains in distribution pipes make coil removal simple

Maintenance

- Achieves the best balance of airflow, heat transfer and pressure drop performance
- Less prone to clogging from debris in building loop